NON-PUBLIC?: N
ACCESSION #: 8704220194
LICENSEE EVENT REPORT (LER)

FACILITY NAME: LaSalle County Station Unit 1 PAGE: 1 of 4

DOCKET NUMBER: 05000373

TITLE: Unit 1 Non-Segregated Bus Duct Fault from the Unit Auxiliary Transformer
EVENT DATE: 03/19/87 LER #: 87-014-00 REPORT DATE: 04/16/87

OPERATING MODE: 1 POWER LEVEL: 054

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Gregory J. Kirchner, Technical Staff Engineer
TELEPHONE #: 815-357-6761 Ext. 704

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: EA COMPONENT: NSBU MANUFACTURER: P295
REPORTABLE TO NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: At 1352 hours on March 19, 1987, with Unit 1 in Operational Condition 1 (Run) at 54% power, a reactor scram occurred due to a generator lockout and subsequent turbine trip (turbine stop valve closure). The generator lockout was caused by an electrical fault that occurred on the non-segregated bus ducts feeding the 6.9 and 4.1 KV loads from the Unit Auxiliary Transformer (UAT) TR-141.

The apparent cause of the event has been determined to be moisture intrusion into one of the bus ducts, possibly occurring at the point where the bus duct penetrates the Turbine Building. The plant performed as expected during the event. All protective relaying functioned properly to interrupt and isolate the fault as well as shutdown the reactor.

An engineering evaluation has been performed to allow operation of Unit 1 with all auxiliary power supplied by the System Auxiliary Transformer (SAT). The UAT and associated bus ducts remain isolated to allow for the repair/replacement of the 6.9 and 4.1 KV bus bars, bus ducts, and wall penetrations damaged by the fault.

(End of Abstract)

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PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as (XX).

A. CONDITION PRIOR TO EVENT

Unit(s): 1 Event Date: March 19, 1987 Event Time: 1352 Hours

Reactor Mode(s): 1 Mode(s) Name: Run Power Level(s): 54%

B. DESCRIPTION OF EVENT

At 1352 hours on March 19, 1987, with Unit 1 in Operational Condition 1 (Run) at 54% power, an electrical fault occurred on the non-segregated bus ducts (AP) (EA) feeding the 6.9 and 4.1 KV loads from the Unit Auxiliary Transformer (UAT) TR-141. The electrical fault caused a "C" phase differential current trip of the UAT and the subsequent generator lockout. Per design, the generator lockout trip initiated the following to interrupt/isolate the fault;

the 345 KV oil circuit breakers 10-11 and 9-10 tripped (opened),

the 4.1 KV Bus 141-X air circuit breaker 1411 tripped (opened),

the 6.9 KV Bus 151 air circuit breaker 1511 tripped (opened), and

the turbine tripped, causing a reactor scram on turbine stop valve closure.

During this event, the UAT deluge actuated and fire/smoke was reported in the Unit 1 Diesel Generator corridor and at the location where the bus ducts enter the plant (from the UAT). The station's fire brigade responded and the fire/smoke was reported out at 1415 hours.

Following the scram, the unit was placed in a stable HOT SHUTDOWN condition.

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C. APPARENT CAUSE OF EVENT

The apparent cause of the event has been determined to be moisture intrusion into one of the bus ducts during recent temperature inversions coupled with the cycling of the UAT (during unit startups and shutdowns) over the same period. The moisture intrusion could have had the compounding effect of leaving contaminants on the bus bars and insulators which over a period of time could have contributed to the cause of the fault. Additionally, an inspection of bus duct Turbine Building penetrations revealed small cracks in the insulating material. It is not known whether the cracks were present before the fault or resulted from the forces generated during the fault. Had the cracks been present prior to the fault, a path for moisture tracking from phase to ground would have existed. The destructive nature of the fault hampered the investigation process, and it is not known on which bus duct (4.1 or 6.9 KV) the fault occurred.

D. SAFETY ANALYSIS OF EVENT

The safety consequences of this event were minimal. The plant performed as expected during the event. Protective relaying functioned properly to interrupt and isolate the fault as well as shutdown the reactor. Per design, the essential loads which were fed from the UAT were automatically transferred to the System Auxiliary Transformer (SAT) TR-142.

E. CORRECTIVE ACTIONS

The following immediate corrective actions were taken:

1. The UAT and associated bus ducts were immediately isolated by station personnel and remain isolated for repair.

2. The UAT was inspected and tested per Work Request L66513. The following was performed:

a) gas and oil sample analyses,

b) turns ratio test, and

c) a meggar (insulation resistance) test of each winding was performed at 2500 VDC.

The testing revealed no apparent damage to the UAT due to the fault.

3. The main power transformers (MPT) 1E and 1W were also inspected and tested. The following was performed:

a) gas and oil sample analyses,

b) meggar tests of all three phases of the isolated phases bus duct feeds to the high voltage windings of the transformers, and

c) meggar tests of the low voltage windings of the transformers.

The testing revealed no apparent damage to either MPT 1E or 1W due to the fault.

4. A meggar test of the Main Generator stator windings revealed no apparent damage due to the fault.

5. Results from the testing on the UAT and MPT, coupled with the fact that the protective relaying properly interrupted/isolated the fault, indicated no further testing was necessary on the generator or the System Auxiliary Transformer (SAT).

6. Inspections and infrared checks of other energized bus ducts in both Units 1 and 2 revealed that no conditions exist at this time which could lead to premature bus duct failure.

7. An engineering evaluation has been performed to allow operation of Unit 1 with all auxiliary power supplied by the SAT. Temporary procedures have been put in place to address operation without the UAT as well as assuring that all assumptions made in the engineering analysis are adhered to. Following this, Unit 1 returned to power and the generator was placed on line on March 25, 1987.

The long-term corrective actions are the following:

1. Repair/replace the 6.9 and 4.1 KV bus bars, bus ducts, and wall penetrations damaged by the fault.

2. The station is working with Delta Unibus and Station Electrical Engineering to develop a wall penetration which is less susceptible to cracking and contamination caused by moisture intrusion. Action Item Record 373-200-87-02700 has been written to track completion of this item.

F. PREVIOUS EVENTS

None.

G. COMPONENT FAILURE DATA

Manufacturer Nomenclature Model Number MFG Part Number

H. K. Porter Corp. 6.9 and 4.1 KV N/A N/A
Bus/Bus Ducts

Note: H. K. Porter Corporation no longer supplies non-segregated bus ducts. Delta Unibus Corporation is present industry contact.

ATTACHMENT # 1 TO ANO # 8704220194 PAGE: 1 of 1

Commonwealth Edison
LaSalle County Nuclear Station
Rural Route #1, Box 220
Marseilles, Illinois 61341
Telephone 815/357-6761

April 16, 1987

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Dear Sir:

Reportable Occurrence Report #87-014-00, Docket #050-373 is being submitted to your office in accordance with 10CFR50.73(a)(2)(iv).

/s/
for G. J. Diederich
Station Manager
LaSalle County Station

GJD/GJK/kg

Enclosure

xc: Nuclear Licensing Administrator
NRC Resident Inspector
NRC Region III Administrator
INPO - Records Center

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